
वैनेडियम पेन्टॉक्साइड — विशिष्टि
(दूसरा पुनरीक्षण)

Vanadium Pentoxide — Specification
(Second Revision)

ICS 77.100

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FOREWORD

This Indian Standard (Second Revision) was adopted by Bureau of Indian Standards, after the draft recommended by Ores and Feed Stock for Iron and Steel Industry Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1973 and subsequently revised in 1974. In view of the experience gained during these years it was felt necessary to revise the standard again. The following modifications have been made in this revision:

- a) Reference and manufacturing clauses have been included;
- b) EH&S hazardous waste label and their pictorial representation have been added in **9.2**; and
- c) The standard had been drafted to homogenize its structure and wording with other product standards.

The composition of the committee responsible for the formulation of this standard is listed in Annex B.

For the purpose of deciding whether particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***VANADIUM PENTOXIDE — SPECIFICATION***(Second Revision)***1 SCOPE**

This standard covers the requirements of vanadium pentoxide used for the production of ferrovanadium.

2 REFERENCES

The following standards contain provisions which through reference in this text constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

<i>IS No.</i>	<i>Title</i>
IS 1387 : 1993	General requirements for the supply of metallurgical materials (<i>second revision</i>)
IS 460	Test sieves — Specifications:
(Part 1) : 2020	Wire cloth test sieve (<i>fourth revision</i>)
(Part 2) : 2020	Perforated plate test sieve (<i>fourth revision</i>)
(Part 3) : 2020	Methods of examination of apertures of test sieves (<i>fourth revision</i>)

3 MANUFACTURE

Vanadium pentoxide shall be manufactured by any process as agreed between manufacturer and the purchaser.

4 SUPPLY OF MATERIAL

4.1 General requirements relating to the supply of vanadium pentoxide shall be as laid down in IS 1387.

4.2 The material shall be supplied in the form of properly cleaned lumps, which are free from any slag and non-metallic residues.

5 CHEMICAL COMPOSITION

5.1 The chemical composition of the material shall be as given in Table 1.

Table 1 Chemical Composition of Vanadium Pentoxide

(Clause 5.1 and 5.2)

Sl No.	Constituent	Percent
(1)	(2)	(3)
i)	Vanadium (as V_2O_5)	98, <i>Min</i>
ii)	Phosphorous (P)	0.05, <i>Max</i>
iii)	Sulphur (S)	0.05, <i>Max</i>
iv)	Antimony (Sb)	0.05, <i>Max</i>
v)	Copper (Cu)	0.05, <i>Max</i>
vi)	Arsenic (As)	0.05, <i>Max</i>
vii)	Alkalis	1.00, <i>Max</i>
viii)	Insolubles (including SiO_2)	1.00, <i>Max</i>

5.2 The determination of chemical constituents shall be as agreed to between the purchaser and the supplier. The supply of material of a composition with limits outside those specified in Table 1 shall be subject to agreement between the supplier and the purchaser.

6 SAMPLING

The material shall be sampled preferably in an inert atmosphere as agreed to between the purchaser and the manufacturer.

7 SIZE

7.1 The size ranges and tolerance of vanadium pentoxide shall be as agreed to between the purchaser and the supplier. Fines below 3.15 mm shall not exceed 1 percent, unless agreed to between the purchaser and the supplier.

7.2 The test sieves used shall be in accordance with sizes specified in IS 460 (Part 1) and IS 460 (Part 2). The standard test sieve will, after period of time, become less accurate. The sieve shall, therefore, be periodically checked according to IS 460 (Part 3) and the correction factor to be applied to the result.

8 PACKING AND HANDLING

The material shall be supplied, packed in suitable containers, in quantities as mutually agreed to between the purchaser and the supplier. Vanadium pentoxide is toxic and hence should be handled and disposed carefully.

9. MARKING

9.1 Each packed material shall be marked with the following:

- a) Manufacturer's name and his recognized trademark, if any;
- b) Quantity; and
- c) Date of validity, if required.

9.2 Each packed material shall be fitted with a label/plate containing cautionary notices written in

EH&S hazardous waste label and their pictorial representation as given in Annex A.

9.3 BIS Certification Marking

The products(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product may be marked with the Standard Mark.

ANNEX A
(Clause 9.2)

EH&S HAZARDOUS WASTE LABEL

A-1 LABLING

Vanadium pentoxide appears as a yellow to red crystalline powder. Slightly soluble in water and denser than water. Contact may cause severe

irritation to skin, eyes, and mucous membranes. May be toxic by ingestion, inhalation and skin absorption. Hence, following EH&S hazardous waste labels given in Fig .1, Fig. 2 and Fig. 3 and adhere it to the bag.



FIG. 1 INDICATES CAN CAUSE CERTAIN HEALTH EFFECTS FOR EXAMPLE, SKIN IRRITATION, EYE IRRITATION, ETC



FIG. 2 INDICATE A CANCER-CAUSING AGENT (CARCINOGEN) OR SUBSTANCE WITH RESPIRATORY, REPRODUCTIVE OR ORGAN TOXICITY THAT CAUSES DAMAGE OVER TIME (A CHRONIC, OR LONG-TERM, HEALTH HAZARD).



FIG. 3 INDICATES CHEMICALS TOXIC TO AQUATIC WILDLIFE (NON-MANDATORY)

A-2 PPE KIT

The following PPE kit shall be used by the person using the material:

- a) Wear a lab coat;
- b) Eye protection; and
- c) Nitrile gloves when working with vanadium pentoxide.

A-3 HAZARDS IDENTIFICATION

The following signals may be displayed at prominent areas of manufacturing and storage units:

<i>Signal</i>	<i>Danger</i>
GHS hazard statements	H302: Harmful if swallowed (warning acute toxicity, oral) H332: Harmful if inhaled (warning acute toxicity, inhalation) H335: May cause respiratory irritation (warning specific target organ toxicity, single exposure, respiratory tract irritation) H341: Suspected of causing genetic defects (warning germ cell mutagenicity) H361d: Suspected of damaging the unborn child (warning reproductive toxicity) H372: Causes damage to organs through prolonged or repeated exposure (danger Specific target organ toxicity, repeated exposure) H411: Toxic to aquatic life with long lasting effects (hazardous to the aquatic environment, long-term hazard)
Precautionary statement codes	P203, P260, P261, P264, P270, P271, P273, P280, P281, P301+P317, P304+P340, P317, P318, P319, P330, P391, P403+P233, P405, and P501 (The corresponding statement to each P-code can be found at the GHS classification page.)

ANNEX B
(Foreword)

COMMITTEE COMPOSITION

Ores and Feedstock for Iron and Steel Industry Sectional Committee, MTD 13

<i>Organization</i>	<i>Representative(s)</i>
National Mineral Development Corporation Limited, Hyderabad	SHRI RAJAN KUMAR (<i>Chairperson</i>)
Agni Steel Private Limited, Erode	SHRI A. RAJASEKARAN
Arcelor Mittal and Nippon steel India Limited, Visakhapatnam	DR ATANU RANJAN OJHA SHRI CH V. S. ND HARIPRASAD (<i>Alternate</i>)
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Facor Alloys Limited, Vizianagaram	SHRI N. S. S. RAMA RAO SHRI R. BHASKARA RAO (<i>Alternate</i>)
Fomento Resources Private Limited, Gao	SHRI MAHENDRAMANGUESH RAMANI SHRI ABHIJIT PEDNEKAR RAMANI (<i>Alternate</i>)
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Jai Balaji Group, Kolkata	SHRI D. SAHOO
Jindal Stainless Limited, Hissar	SHRI ASHISH GOYAL SHRI SUYASH TRIVEDI (<i>Alternate</i>)
JSW Steel Limited, Bellary	SHRI P. C. MAHAPATRA SHRI C. R. PRAMOD KUMAR (<i>Alternate</i>)
KIOCL Limited, Bengaluru	SHRI M. A. SALAM SHRI P. PALANI (<i>Alternate</i>)
Manganese Ore (India) Limited, Nagpur	SHRI. RAJESH BHATTACHARYA SHRIMATI SNEHA TIWAR (<i>Alternate</i>)
Mineral Exploration Corporation Limited, Nagpur	SHRI P. RAVINDRAN SHRI SANTOSH KUMAR SATAPATHY (<i>Alternate</i>)
Mitra S.K. Private Limited, Kolkata	SHRI SAJAL MITRA SHRI P. L. BOSE (<i>Alternate</i>)
M.N. Dastur & Co Limited, Kolkata	SHRI AVIJIT PODDAR
National Institute of Secondary Steel Technology, Mandi Gobindgarh	SHRI RAJIB KUMAR PAUL SHRI SANDEEP PAL SINGH (<i>Alternate</i>)
National Mineral Development Corporation Limited, Hyderabad	SHRI VIBHUTI ROSHAN

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Pellet Manufacturer's Association of India, New Delhi	SHRI DEEPAK BHATNAGAR
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Shriram Institute for Industrial Research New Delhi	SHRI BALAN GOVIDAN SHRI SHAMBHU THAKUR (<i>Alternate</i>)
Sponge Iron Manufacturers Association, New Delhi	SHRI D. KASHIVA
Tata Steel, Jamshedpur	DR A. K. MUKHERJEE
BIS Directorate General	SHRI SANJIV MAINI, SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD (METALLURGICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary

SHRI G. RAM SAI KUMAR
SCIENTIST 'B'/ASSISTANT DIRECTOR
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